# DESIGN THINKING AND INNOVATION
# (Common to all Branches)

**Course Code: 20ME11D1**

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**Course Outcomes:** After successful completion of this activity the student will be able to
**CO1:** outline a problem, apply methods of Empathy on user groups
**CO2:** describe and Define the problem specific to the user group
**CO3:** apply Ideation tools to generate Ideas to solve the problem
**CO4:** develop prototype
**CO5:** test the ideas and demonstrate Storytelling ability to present the Ideas

***Students shall form into groups and Identify a problem (preferably societal problem with engineering orientation to solve) suitable for the design thinking and go through the process week-wise. At the end of each phase, brief documentation shall be submitted and a final report covering all phases has to be submitted at the end of the semester.***

**Weeks 1-3:**
Introduction to Design Thinking: A primer on design thinking - Traditional approach, The new design thinking approach. Stages in Design Thinking: Empathize, Define, Ideate, Prototype, Test. Mindset for design thinking, Design thinking for product and process innovation, Difference between engineering design and design thinking.
**Case Studies:** General, Engineering and Service applications.
**Activities:** Identify an Opportunity and Scope of the Project
Explore the possibilities and Prepare design brief

**Weeks 4-6:**
**Methods and Tools for Empathize and Define phases:**
Empathize - Methods of Empathize Phase: Ask 5 Why / 5W+H questions, Stakeholder map, Empathy Map, Peer observation, Trend analysis
Define - Methods of Define Phase: Storytelling, Critical items diagram, Define success
**Activities:** Apply the methods of empathize and Define Phases
Finalize the problem statement

**Weeks 7-8:**
**Methods and Tools for Ideate phase:**
Ideate - Brainstorming, 2X2 matrix, 6-3-5 method, NABC method;
**Activities:** Apply the methods of Ideate Phase: Generate lots of Ideas

**Weeks 9-11:**
**Methods and Tools for Prototype Phase:**
**Prototype** - Types of prototypes - Methods of prototyping - Focused experiments, Exploration map, Minimum Viable Product;
**Activities:** Apply the methods of Prototype Phase: Create prototypes for selected ideas

**Weeks 12-13:**
**Methods and Tools for Test Phase:**
**Test - Methods of Testing:** Feedback capture grid, A/B testing
**Activities:** Collect feedback; iterate and improve the ideas

**Weeks 14-15:**
**Solution Overview** - Create a Pitch - Plan for scaling up - Road map for implementation

**Activities:** Present your solution using Storytelling method
**Week 16:**
**Project Submission:** Fine tuning and submission of project report

**Reference Books**:


1. Tim Brown, *Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation*, HarperCollins e-books, 2009.
2. Michael Lewrick, Patrick Link, Larry Leifer, *The Design Thinking Toolbox,* John Wiley & Sons, 2020.
3. Michael Lewrick, Patrick Link, Larry Leifer, *The Design Thinking Playbook*, John Wiley & Sons, 2018.
4. Kristin Fontichiaro, *Design Thinking*, Cherry Lake Publishing, USA, 2015.
5. Walter Brenner, Falk Uebernickel, *Design Thinking for Innovation - Research and Practice*, Springer Series, 2016.
6. Gavin Ambrose, Paul Harris, *Design Thinking*, AVA Publishing, 2010.
7. Muhammad Mashhood Alam, *Transforming an Idea into Business with Design Thinking,* First Edition, Taylor and Francis Group, 2019.
8. S.Balaram, *Thinking Design*, Sage Publications, 2011.


**Web References**:


1. https://designthinking.ideo.com/
2. https://thinkibility.com/2018/12/01/engineering-vs-design-thinking/
3. https://www.coursera.org/learn/design-thinking-innovation
4. https://swayam.gov.in/nd1_noc20_mg38/preview